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FAX-MACHINE WITH SMS-FUNCTIONALITY  
[FAXGERÄT MIT SMS-FUNKTIONALITÄT]

GOERTZ WERNER

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## Description

[0001] The invention relates to a fax-machine which receives short messages from another telecommunication terminal or sends to another telecommunication terminal and a process for transmission of short messages between a telecommunication terminal and a fax machine.

[0002] It is known that GSM-mobile- radio network offers a short message service to the subscriber; this service is generally also known as Short Message Service SMS. The short message service permits unidirectional transmission of messages with limited scope. The short messages are not transmitted in the traffic channel, i.e. in the service channel, but in an organization channel.

[0003] There are three types of short message service namely SMS/Point to Point Mobile Originated (SMS/PP MO), SMS/Point to Point Mobile Terminated (SMS/PP MT) and SMS/Cell Broadcast (SMS/CB). It is possible to send short messages from an appropriately configured GSM-mobile telephone to a Short Message Service Centre in case of SMS/PP MO; it is colloquially called as Short Message Service Center (SMSC). In case of short message service of SMS/PP MT, short messages can be received by a Short Message Service Center and the SMS/CB is used for the transmission of broadcast messages from a Short Message Service Center to all ready-to-receive GSM-mobile telephones in a prescribed region.

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<sup>2</sup> Numbers in the margin indicate the pagination in the foreign text.

[0004] The Short Message Service Center is the exchange centre for short messages. All messages are firstly stored intermediately in it till the recipient is reachable in order to transmit the short message to him. Incoming messages are stored on a memory card, the so-called SIM-card of the mobile subscriber and signaled to the mobile subscriber via a display unit.

[0005] The short messages which are transmitted generally in the 7-bit-character format, can be a maximum of 160 characters long. The transmission of text lengths more than 39,000 characters is possible with the help of so-called concatenation-mechanism.

[0006] The sending of short messages from GSM-mobile telephones to fax machines is possible only via a special facility of Short Message Service Center; it converts the short message sent by GSM-mobile telephone and explicitly tagged as Fax into the fax-format and is sent to a fax-machine. The conversion of format of short messages from SMS-format into the fax-format is undertaken by the Short Message Service Center.

[0007] It was found that a short message service for fixed network was established in Germany and even in an European country. This short message service makes it possible to send and receive short messages with analogous as well as ISDN-telephones which was so far possible only with GSM-mobile telephones. The sending and receiving of short messages is implemented via a Short Message Service Center which is connected to a public telephone network.

[0008] The transmission of short messages to fax machines is possible within the new short message service whereby the conversion of short messages from SMS-format into

the Fax-format is undertaken by the Short Message Service Center. A short message is created with the help of an input device in a fixed network telephone which is provided with a fixed network- SMS-protocol stack. This short message is firstly sent to the Short Message Service Center in the SMS-format. The Short Message Service Center which is provided with a fixed network- SMS-protocol stack as well as with a fax- protocol stack, converts the format of short message from SMS-format into the fax-format and further routes the short message received in the SMS-format to the fax machine with the help of Fax- protocol stack; this fax machine is provided with a fax- protocol stack whereby the short message can then be displayed on an output device of the fax machine. A direct sending of a short message to the fax machine without the described format conversion by the Short Message Service Center is not possible within the new short message service in this way.

[0009] Therefore, the task of this invention is to specify a technical solution for transmission of short messages from a telecommunication terminal to a fax machine or from a fax machine to a telecommunication terminal whereby the format conversion of short messages required so far is omitted in the Short Message Service Center.

[0010] This problem is solved as per the invention with a fax machine corresponding to the characteristics of Claim 1 and a process for transmission between a fax machine and a telecommunication terminal corresponding to the characteristics of Claim 12.

Advantageous developments of the invention are given in the sub-claims.

[0011] As per the invention, a protocol stack is implemented in the fax machine which receives/sends short messages from/to a telecommunication terminal. This protocol stack processes the short messages received/sent in SMS-format for display of short messages in the fax machine and sends the short messages inputted in the fax machine.

[0012] An advantage of the invention due to the implementation of protocol stack in the fax device is the option of direct transmission of a short message from a telecommunication terminal to a fax machine without the Short Message Service Center having to undertake a format conversion from SMS-format into the fax-format. Thus, the extra cost incurred for format conversion from SMS-format into fax-format by the Short Message Service Center is avoided for the sender.

[0013] Another advantage of the invention is that a fixed network- SMS- protocol stack which will have the option of sending and receiving short messages in fixed network telephones in the near future, will also be implemented in the fax machine by which compatibility problems during transmission of short messages between a fixed network telephone and a fax machine are avoided.

[0014] Other advantages of the invention can be obtained from the following description which is explained with the help of enclosed drawings and two examples.



[0015] The figures show in schematic presentation:

[0016] Fig. 1 is a block diagram showing the transmission of short messages between a telecommunication terminal designed as a fixed network telephone and a fax machine;

[0017] Fig. 2 is a block diagram showing the transmission of short messages between a telecommunication terminal designed as a mobile telephone and a fax machine;

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[0018] Fig. 1 shows an example in which a telecommunication terminal TKEG is designed as a fixed network telephone; it is connected to a Short Message Service Center of a fixed network SMSCF which is a part of the telecommunication network TKN. The Short Message Service Center of fixed network SMSCF is in turn connected to a fax machine FAX. Switching devices of telecommunication network TKN that are connected between the fax machine FAX and the Short Message Service Center of fixed network SMSCF or between the telecommunication terminal TKEG and the Short Message Service Center of fixed network SMSCF are not shown in Fig. 1 since they are not relevant for the development of the invention.

[0019] A short message SMS is created in an input-/output device E/A for example by inputting via a keyboard in the telecommunication terminal TKEG designed as a fixed network telephone. A fixed network- SMS-protocol- stack which is implemented in the fixed network telephone thus, determines the format and other parameters like time

lapses and error handling for the final transmission of the created short message SMS.

The short message SMS can be sent in SMS-format via the telecommunication network TKN to the fax machine FAX. The short message SMS sent in SMS-format is firstly received by the Short Message Service Center of the fixed network SMSCF which further transmits the short message SMS to the fax machine FAX.

[0020] The short message SMS transmitted further to the fax machine FAX is received by the fax machine FAX and can be processed further in the fax machine FAX with the help of a Fixed network- SMS-protocol stack implemented in the Fax machine FAX.; it is outputted on an input-/output device, i.e. displayed on a display unit of a fax machine FAX and/or is printed on the paper roll of the fax machine FAX.

[0021] Thus, a short message SMS can be sent directly i.e. without format conversion, by the Short Message Service Center SMSCF to the concerned fax machine FAX. The Short Message Service Center SMSCF does not differentiate between the fax machine FAX and a telecommunication terminal TKEG designed as a fixed network telephone that enables the sending or receiving of short messages SMS. Conversion of short messages into the fax format by the Short Message Service Center SMSCF costs money. This is avoided.

[0022] The short message SMS is created in a fax machine FAX in the input-/output device E/A for e.g. by inputting via a keyboard or by reading a printed sheet. The sending of this message takes place in the reverse direction if necessary, stored in the intermediate storage in a memory of the fax machine FAX. Thereby, the read-in or created short message is sent to the telecommunication terminal TKEG which is designed as a fixed

network telephone via the Short Message Service Center of fixed network SMSCF with the help of the fixed network-SMS-protocol- stack implemented in the fax machine FAX. The Short Message Service Center SMSCF which is provided with a fixed network-SMS-protocol stack takes over even the function of transfer. A format conversion of short message SMS by the Short Message Service Center SMSCF is also not required here. The short message SMS is received by the fixed network telephone and is outputted on a display device of the fixed network telephone via an input-/output device E/A or even acoustically via the loudspeaker of the fixed network telephone after successful acoustic signalization.

[0023] Fig. 2 shows a modification of an example of Fig. 1 in which the transmission of a short message SMS takes place between a fax machine FAX and a telecommunication terminal TKEG designed as a GSM-mobile telephone.

[0024] The GSM-mobile telephone is connected to a Short Message Service Center of a mobile phone network SMSCM which is part of a telecommunication network TKN. The Short Message Service Center of mobile phone network SMSCM is on its part, connected to a Short Message Service Center of a fixed network SMSCF which is also a part of the telecommunication network TKN, whereby the Short Message Service Center of fixed network SMSCF is in turn connected to a fax machine FAX. Even in this figure, the switching devices of the telecommunication network TKN between the fax machine FAX and the Short Message Service Center of fixed network SMSCF or the Short Message Service Center of the fixed network SMSCF and Short Message Service Center of mobile

phone network SMSCM or Short Message Service Center of mobile phone network SMSCM and the telecommunication terminal TKEG designed as a GSM-mobile telephone are not shown because they are not relevant for the development of the invention.

[0025] The short message SMS which is created in the SMS-format on the input-/ output device of GSM-mobile telephone and which must be sent to the fax machine FAX, is firstly transmitted by the GSM- mobile telephone to the Short Message Service Center of mobile phone network SMSCM which is provided with a mobile- network- SMS- protocol stack. The Short Message Service Center of mobile phone network SMSCM transmits the short message SMS further to the Short Message Service Center of the fixed network SMSCF which is provided with a fixed network- SMS- protocol stack and it transmits further, in turn, the short message SMS to the fax machine FAX.

The short message SMS created in the SMS-format does not undergo any format conversion on its way to the fax machine FAX. A fixed network- SMS-protocol stack is in turn implemented in the fax machine FAX; this stack processes the received short message SMS i.e. converts, for e.g. into an image format so that the short message SMS in the fax machine FAX is displayed on the input-/output device E/A of say, a display device of fax machine FAX and/or printed on the paper roll of the fax machine FAX.

[0026] While sending a short message SMS from the fax machine FAX to the telecommunication network TKEG designed as a GSM-mobile telephone, a short message SMS is created with the help of an input-/output device E/A, say, by inputting

via the keyboard of a fax machine FAX or by reading the information which is printed on a sheet. The inputted or read in short message SMS is sent to the Short Message Service Center of fixed network SMSCF as a short message SMS with the help of fixed network-SMS-protocol stack which is implemented in the fax machine FAX; this centre, in turn, transfers the short message SMS to the Short Message Service Center of mobile phone network SMSCM. The Short Message Service Center of the mobile phone network SMSCM transfers the short message SMS further to the GSM-mobile telephone where the short message SMS is displayed on an input-/output device E/A, say, of a display device of GSM-mobile telephone or can be outputted via the loudspeaker of the GSM-mobile telephone after successful acoustic signalization.

[0027] Even in this example, both the Short Message Service Centers have only transfer functions and therefore, do not convert formats of short messages SMS.

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[0028] Due to the further processing of short message SMS by the fixed network- SMS-protocol stack in the fax machine FAX, the sender of the short message SMS saves the cost of format conversion by the Short Message Service Center of the fixed network SMSCF and/or of the mobile phone network SMSCM with this service. A fax machine FAX which is provided with a fixed network- SMS- protocol stack is not different from the fixed network telephone which is provided with a fixed network- SMS-protocol stack from the viewpoint of a Short Message Service Center SMSCF/SMSCM.

[0029] The examples refer to the telecommunication terminals TKEG which are designed as fixed network telephones or GSM-mobile telephones. Other telecommunication terminals TKEG in which a fixed network- SMS-protocol stack is implemented are suitable for the implementation of the invention. These are analogous, digital and cordless fixed network telephones, a PC with an in-built modem for data communication, mobile telephones in arbitrary mobile communication networks and portable radios.

[0030] Even the telecommunication terminal TKEG can be designed as a second fax machine FAX with an implemented fixed network- SMS-protocol stack. The exchange of short messages SMS takes place, in this case, between two fax machines FAX.

#### Patent claims

1. Fax machine (FAX) which receives/sends short messages (SMS) from/to a telecommunication terminal (TKEG), whereby the short messages (SMS) undergo format conversion between SMS-format and Fax-format or Fax-format and SMS-format, **characterized in that**, a protocol stack is implemented in the fax machine (FAX), which further processes received/sent short messages (SMS) in SMS-format for outputting of short messages (SMS) in the fax machine (FAX) and in the fax machine (FAX) for sending inputted short messages (SMS).
2. Fax machine (FAX) according to Claim 1, characterized in that the protocol stack is a fixed-network- SMS-protocol stack which can be used in fixed network telephones.

3. Fax machine (FAX) according to Claim 1, characterized in that, at least one Short Message Service Center (SMSCF, SMSCM) is the exchange centre for transmission of short messages (SMS).
4. Fax machine (FAX) according to Claim 1 or 2, characterized in that the telecommunication terminal (TKEG) is a fixed network telephone.
5. Fax machine (FAX) according to Claim 3, characterized in that the telecommunication terminal (TKEG) is an analogous fixed network telephone.
6. Fax machine (FAX) according to Claim 3, characterized in that the telecommunication terminal (TKEG) is a digital fixed network telephone.
7. Fax machine (FAX) according to Claim 3, characterized in that the telecommunication terminal (TKEG) is a cordless telephone.
8. Fax machine (FAX) according to Claim 3, characterized in that the telecommunication terminal (TKEG) is a computer with a modem.
9. Fax machine (FAX) according to Claim 1 or 2, characterized in that the telecommunication terminal (TKEG) is a mobile telephone.
10. Fax machine (FAX) according to Claim 1 or 2, characterized in that the telecommunication terminal (TKEG) is a portable radio.
11. Fax machine (FAX) according to Claim 1 or 2, characterized in that the telecommunication terminal (TKEG) is a second fax machine (FAX) with an implemented protocol stack.
12. Process for receiving/sending of short messages (SMS) by a fax machine (FAX) from/to a telecommunication terminal (TKEG) whereby the format of short

messages (SMS) is converted from the SMS-format into the fax-format or from fax-format into the SMS-format, characterized in that the received/sent short messages (SMS) are processed further by a protocol stack in the fax machine (Fax) for outputting of short messages (SMS) in the fax machine (FAX) and in the fax machine (FAX) for sending of inputted short messages (SMS).

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2 page(s) of drawings attached herewith

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DRAWINGS PAGE 1

Number: DE 101 14 950 A1  
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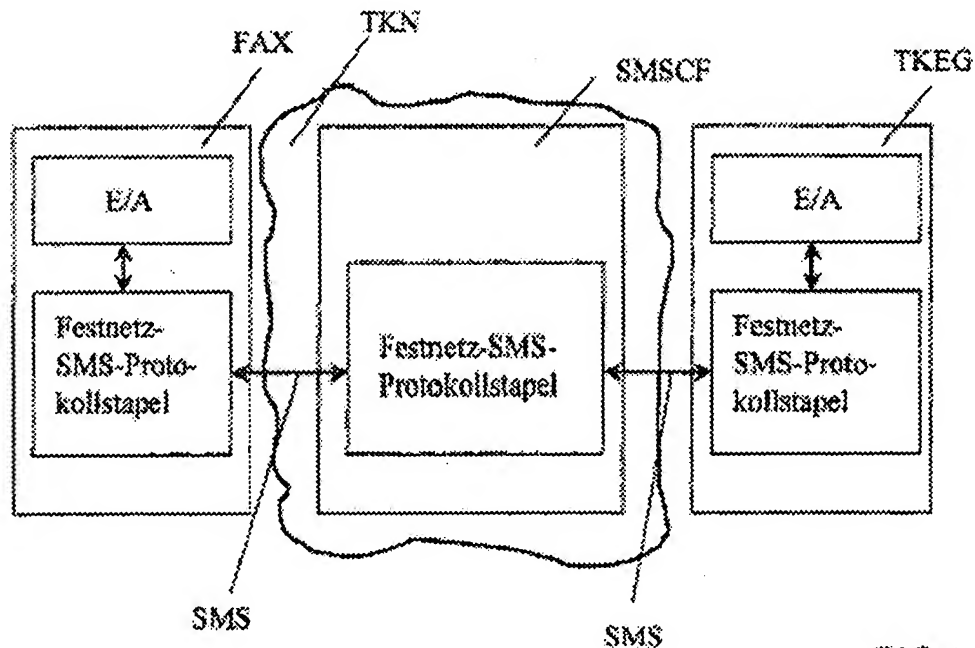


FIG 1



Festnetz-SMS-Protokollstapel = Fixed network- SMS- protocol stack

DRAWINGS PAGE 2

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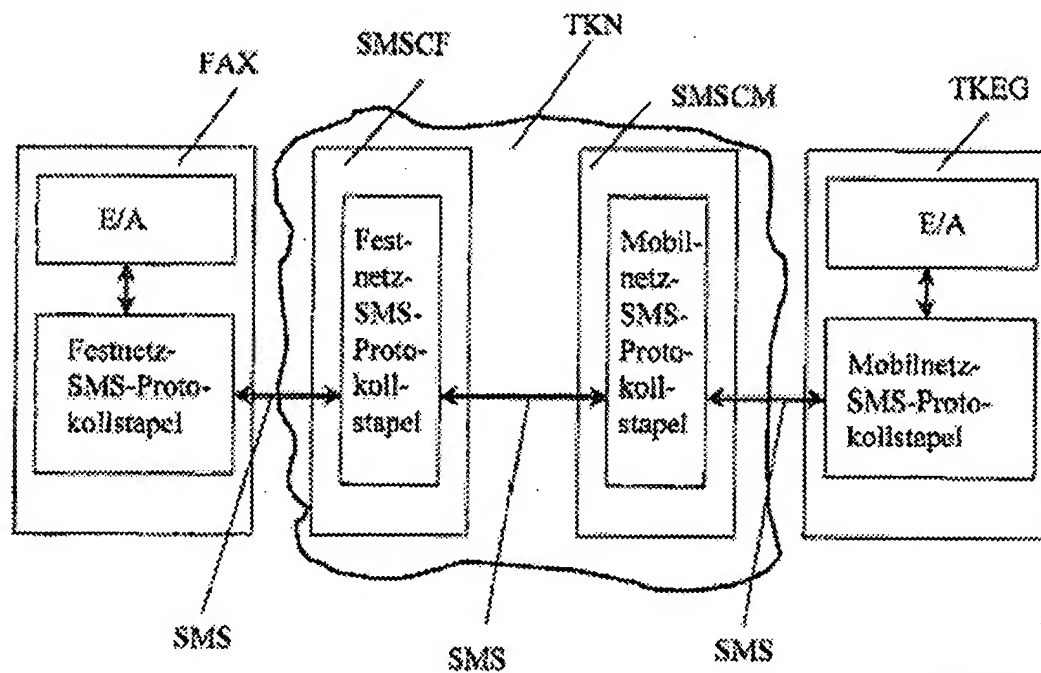


FIG 2

Festnetz-SMS-Protokollstapel = Fixed network- SMS- protocol stack